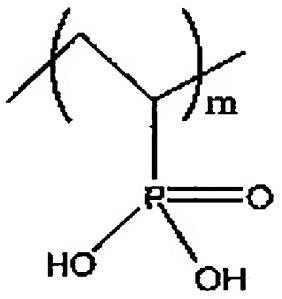
WHAT IS CLAIMED IS:

1. An organic anti-reflective coating comprising:

a polymer represented by the following formula I and

Formula I




wherein m is an integer ranging from 5 to 5000.

2. The organic anti-reflective coating according to claim 1, wherein the polymer has a molecular weight ranging from about 2,000 to about 10,000.

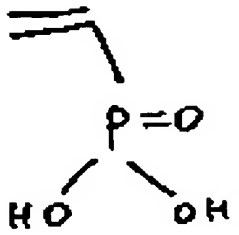
3. A method for preparing the polymer of claim 1 comprising:

dissolving vinylphosphonic acid having a structure represented by the following formula II in organic solvent;

adding a polymerization initiator to the dissolved solution; and

conducting free-radical polymerization under vacuum condition, at a temperature ranging from about 60 to about 70°C for a time period ranging from about 2 to about 6 hours.

Formula II



4. The method according to claim 3, wherein the organic solvent comprises at least one material selected from a group consisting of tetrahydrofuran, cyclohexanone, dimethyl formamide, dimethyl sulfoxide, dioxane, methylethylketone, PGMEA, ethylacetate, benzene, toluene, xylene and mixtures thereof.

5. The method according to claim 3, wherein the polymerization initiator comprises a material selected from a group consisting of 2,2'-azobis isobutyronitrile (AIBN), benzoyl peroxide, acetyl peroxide, lauryl peroxide, t-butyl peracetate, t-butyl hydroperoxide, di-t-butyl peroxide and mixtures thereof.

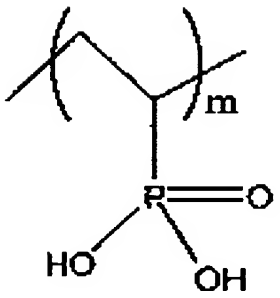
6. The method according to claim 4, wherein the polymerization initiator comprises a material selected from a group consisting of 2,2'-azobis isobutyronitrile (AIBN), benzoyl peroxide, acetyl peroxide, lauryl peroxide, t-butyl peracetate, t-butyl hydroperoxide, di-t-butyl peroxide and mixtures thereof.

7. An organic anti-reflective coating composition comprising:

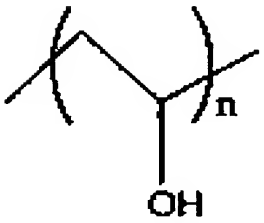
a polymer represented by the following formula I; and

at least one polymer selected from a group consisting of formula III, formula IV and mixtures thereof.

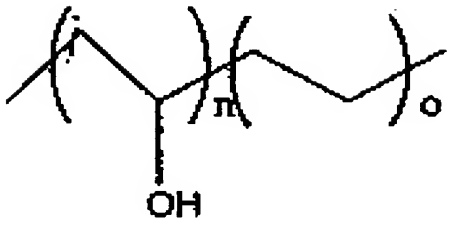
Formula I




Formula III




Formula IV




wherein, in above formulas, m, n and o are integers ranging from 5 to 5000.

8. The composition according to claim 7, wherein the polymer represented by the formula I is present in an amount ranging from about 1 to about 20% wt%.

9. The composition according to claim 7, wherein the at least one polymer represented by formula III or IV is present in an amount ranging from about 1 to about 20% wt%.

10. The composition according to claim 8, wherein the at least one polymer represented by formula III or IV is present in an amount ranging from about 1 to about 20% wt%.

11. The composition according to claim 7, wherein the composition further comprises an amine compound.

12. The composition according to claim 11, wherein the amine compound is an aliphatic alkyl amine or an aliphatic alkyl ammonium salt.

13. A method for forming pattern on a semiconductor device comprising:

coating a photoresist film on a semiconductor substrate;

applying the organic anti-reflective coating composition according to claim 7 on a top portion of the photoresist film; and

exposing and developing the photoresist film to produce a photoresist pattern.

14. The method according to claim 11, further comprising a baking process before or after the exposing.

15. The method according to claim 13, wherein the developing carried out of using aqueous solution of present in an amount ranging from about 0.01 to about 5wt% tetramethylammonium hydroxide (TMAH) as a developing solution.

16. The method according to claim 15, wherein the developing carried out of using aqueous solution of present in an amount ranging from about 0.01 to about 5wt% tetramethylammonium hydroxide (TMAH) as a developing solution.

17. A semiconductor device produced by the pattern formation method of claim 13.